CLAIMS

[Claim(s)]

[Claim 1] In the surface mounting component mounting machine which equips the predetermined position on a printed circuit board with the electronic parts which have a solder bump part The time of equipping a mounting head with said electronic parts by which adsorption maintenance was carried out in the predetermined position on said printed circuit board, It is in the fixture for electronic-parts mounting accuracy evaluation which evaluates electronic-parts mounting accuracy. The fixture for electronic-parts mounting accuracy evaluation characterized by making the evaluation substrate which prepared the installation part of said electronic parts which has permeability install instead of this printed circuit board to the attaching position where said printed circuit board in said surface mounting component mounting machine was defined.

[Claim 2] An evaluation substrate is a fixture for electronic-parts mounting accuracy evaluation according to claim 1 characterized by preparing a standard display object in the fixing point in the installation part of electronic parts.

[Claim 3] An evaluation substrate is a fixture for electronic-parts mounting accuracy evaluation according to claim 1 or 2 characterized by preparing a maintenance means to prevent secession of these electronic parts with which it was equipped in the fixing point in the installation part of electronic parts.

[Claim 4] In the surface mounting component mounting machine which equips the predetermined position on a printed circuit board with the electronic parts which have a solder bump part The time of equipping a mounting head with said electronic parts by which adsorption maintenance was carried out in the predetermined position on said printed circuit board, [the evaluation substrate which prepared the installation part of said electronic parts which is in the electronic-parts mounting accuracy valuation method by which electronic-parts mounting accuracy is evaluated, and has permeability] [attaching position / where said printed

circuit board in said surface mounting component mounting machine was defined] To the position of the standard display object in the upper surface of this evaluation substrate, make it install instead of this printed circuit board, equip said mounting head with said electronic parts by which adsorption maintenance was carried out, and [this state] The electronic-parts mounting accuracy valuation method characterized by comparing the position of said standard display object and the ball shape portion of said solder bump part, and measuring gap of the lengthwise direction and transverse direction which are the mounting accuracy of these electronic parts from the back of this evaluation substrate.

[Claim 5] It is the electronic-parts mounting accuracy valuation method according to claim 4 characterized by performing Measurement Division of the mounting accuracy of electronic parts by Image Processing Division by a detection means.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the fixture for electronic-parts mounting accuracy evaluation and electronic-parts mounting accuracy valuation method which can raise the mounting accuracy of the electronic parts to a printed circuit board.

[0002]

[Description of the Prior Art] If it is in the surface mounting component mounting machine which equips the predetermined position on a printed circuit board with electronic parts When the mounting accuracy which this surface mounting component mounting machine has is measured in advance and that accuracy has separated from tolerance level, it has managed so that it may be settled within the limits of the mounting accuracy which adjusts and wishes this surface mounting component mounting machine side. That is, to the fiducial point with which each move value of the X-Y axial direction of the mounting head which carries out adsorption maintenance of the electronic parts, and theta axial direction was defined beforehand and with which it equips, it is made to move correctly into tolerance level, or it is necessary for rash acts, such as the posture, to be in tolerance level in the installation to a printed circuit board.

[0003] [however, the packed type electronic parts with which it is in the aforementioned accuracy management, and the solder bump part is conventionally constituted by ball shape, for example CSP, BGA, etc.,] Since the solder bump part is prepared in the undersurface of the base board after up to a printed circuit board is equipped, The fixing point of the solder bump part to a printed circuit board was what cannot recognize in the sight check from the outside and cannot evaluate mounting accuracy of the electronic parts in a surface mounting component mounting machine.

[0004]

[Problem to be solved by the invention] [the evaluation substrate which prepared the installation part of electronic parts which was made in order that this invention might solve the above mentioned problem, and has permeability] [attaching position / where the printed circuit board in a surface mounting component mounting machine was defined] To the position of the standard display object in the upper surface of this evaluation substrate, make it install free [attachment and detachment] instead of this printed circuit board, equip a mounting head with the electronic parts by which adsorption maintenance was carried out, and [this state] By comparing the position of a standard display object and the ball shape portion of said solder bump part, and measuring gap of the lengthwise direction and transverse direction which are the mounting accuracy of these electronic parts from the back of this evaluation substrate It aims at offering the fixture for electronic-parts mounting accuracy evaluation and electronic-parts mounting accuracy valuation method which can ensure [simply and] evaluation equipped with the electronic parts which have a solder bump part of the mounting accuracy of a surface mounting component mounting machine.

[0005]

[Means for solving problem] [the means of this invention for attaining the above mentioned purpose] In the surface mounting component mounting machine which equips the predetermined position on a printed circuit board with the electronic parts which have a solder bump part The time of equipping a mounting head with said electronic parts by which adsorption maintenance was carried out in the predetermined position on said printed circuit board, It is in the fixture for electronic-parts mounting accuracy evaluation which evaluates electronic-parts mounting accuracy. It is in the composition of the fixture for electronic-parts mounting accuracy evaluation in which the evaluation substrate which prepared the installation part of said electronic parts which has permeability was made to install instead of this printed circuit board to the attaching position where said printed circuit board in said surface mounting component mounting machine was defined.

[0006] Moreover, an evaluation substrate prepares a standard display object in the fixing point in which the installation part of electronic parts was prepared. An evaluation substrate prepares a maintenance means to prevent secession of these electronic parts with which it was equipped in the fixing point in which the installation part of electronic parts was prepared.

[0007] And the electronic parts which have a solder bump part are set to the surface mounting component mounting machine with which the predetermined position on a printed circuit board is equipped. The time of equipping a mounting head with said electronic parts by which adsorption maintenance was carried out in the predetermined position on said printed circuit board, It is in the fixture for electronic-parts mounting accuracy evaluation which evaluates electronic-parts mounting accuracy. [the evaluation substrate which prepared the installation

part of said electronic parts which has permeability / attaching position / where said printed circuit board in said surface mounting component mounting machine was defined] To the position of the standard display object in the upper surface of this evaluation substrate, make it install instead of this printed circuit board, equip said mounting head with said electronic parts by which adsorption maintenance was carried out, and [this state] From the back of this evaluation substrate, the position of said standard display object and the ball shape portion of said solder bump part is compared, and it is in the electronic-parts mounting accuracy valuation method which measures gap of the lengthwise direction and transverse direction which are the mounting accuracy of these electronic parts.

[0008] Moreover, Image Processing Division by a detection means performs Measurement Division of the mounting accuracy of electronic parts.

[0009]

[Working example] Next, an example of operation of the fixture for electronic-parts mounting accuracy evaluation about this invention and an electronic-parts mounting accuracy valuation method is explained based on Drawings. In drawing 1 and drawing 2 , A is a fixture for electronic-parts mounting accuracy evaluation, and is set to the surface mounting component mounting machine W. [the solder bump parts b1, such as CSP and BGA, as shown in the packed type electronic parts b, for example, drawing 4 , / the electronic parts b constituted by ball shape or abbreviation ball shape] It uses, when evaluating the mounting accuracy of the surface mounting component mounting machine W at the time of equipping up to printed circuit board c in an applied part n, and it is constituted by the evaluation substrate 2 which formed the installation part 1 of the electronic parts b which has permeability.

[0010] The glass [which has a rear surface / which forms laminated] board with that good plane accuracy which has transparent or what is called permeability (visibility) that can carry out visible from the surface to the back is used for this evaluation substrate 2. Moreover, the perimeter part of this evaluation substrate 2 is equipped with the frame 5 supported by the transfer rail 4 in the conveyance means 3 which crossed the applied part n of the surface mounting component mounting machine W. the same operation as the time of installing printed circuit board c in the right position beforehand defined in the applied part n -- a standard pin, a rear clamp, a side clamp, and a main clamp -- and it pushes up and is installed by a pin (not shown) etc.

[0011] Furthermore, the standard display object 6 is formed in the fixing point in which the evaluation substrate 2 in this fixture A formed the installation part 1 of the electronic parts b, it consists of a lattice group of a large number formed of printing etc. at the predetermined pitch, and the absolute exact position to the evaluation substrate 2 of Fixture A is set up. This standard display object 6 is 0.1mm in line thickness, for example, and the pitch of the lattice formed is what has the thing of two or more pitches like 0.8mm, 0.75mm, 0.65mm, or 0.5mm.

Altogether, the number of predetermined sets prepares or the standard display object 6 of this different lattice pitch group prepares the thing of a lattice pitch to wish in the evaluation substrate 2 of one sheet.

[0012] Moreover, preferably, the signs 6a, such as a fiducial mark with this standard display object 6 and the position relative relation to the surroundings of this standard display object 6, are formed in four places of the circumference of the standard display object 6, and are used for two or more places as the starting point for wearing of the electronic parts b.

[0013] Furthermore, a maintenance means 7 to prevent secession of these electronic parts b with which it was equipped is formed in the fixing point in which this evaluation substrate 2 formed the installation part 1 of the electronic parts b, and the adhesion member which has easy-releasability is used. Specifically, it is welded by pressure in a transparent or adhesion [in / electronic parts / b / by which adsorption maintenance was carried out at the adsorption nozzle 10 of the mounting head 9 which carries out / in / the double-sided tape which has permeability (visibility) is good, and / the surface mounting component mounting machine W / a postscript / in the solder bump part b1 of that undersurface / this maintenance means 7] member side.

[0014] In addition, the above mentioned surface mounting component mounting machine W is that from which the fixing point of the electronic parts b in an applied part n etc. is obtained according to the program which was inputted into the control means 8 by a conventional computer etc., and which was defined beforehand. As shown in drawing 3 , it has the mounting head 9 which moves to the X-axis and Y axial direction arbitrarily, and this mounting head 9 is equipped with the adsorption nozzle 10 which is the attachment component of the electronic parts b with which it moves to Z axial direction arbitrarily, and arbitrary theta angles (rotation angle) are acquired.

[0015] In addition, if it is in the surface mounting component mounting machine W, it has the feed section m of the electronic parts b prepared in this body 11, and as shown in drawing 3 , that in which much electronic parts b were laid, the tape feeder which arranged in the predetermined position and was prepared in it, etc. are used for a tray. [many]

[0016] And the attitude object 13 which attaches the detailed composition to the body 11, and moves in the direction of order (Y-axis) arbitrarily by the attitude means 12, While having attached the adsorption nozzle 10 to the mounting head 9 engaged to the movable object 15 which attaches to this attitude object 13 and moves to a horizontal direction (X-axis) arbitrarily by the transportation device 14, and this movable object 15 free [rise and fall] by the rise-and-fall means (not shown) Rotation of theta angles (rotation angle) arbitrary as a center of a vertical axis direction is enabled by the pivot means (not shown), and each means for each drive operates with high precision by the servomotor in which numerical control is possible.

[0017] Therefore, the operation of one work example of the fixture A for electronic-parts

mounting accuracy evaluation concerning this invention and an electronic-parts mounting accuracy valuation method is as follows. In the surface mounting component mounting machine W, the electronic parts b which have the solder bump part b1 are beforehand prepared for the feed section m, if it is in wearing to printed circuit board c, examine the mounting accuracy of this surface mounting component mounting machine W, and perform predetermined evaluation to the obtained result.

[0018] That is, in the surface mounting component mounting machine W as shows drawing 3 the fixture A as shown in drawing 1 and drawing 2 , it replaces with printed circuit board c, and it positions what is called to the applied part n of the electronic parts b, and attaches to the same position as this printed circuit board c to it.

[0019] In this state, the surface mounting component mounting machine W is worked, adsorption maintenance of the predetermined electronic parts b is carried out by the adsorption nozzle 10 of that mounting head 9 from a feed section m, and it carries to an applied part n. At this time, that operation information is beforehand inputted into the control means 8, and a motion of the mounting head 9 is performed based on this.

[0020] By the operation of this mounting head 9, the electronic parts b by which adsorption maintenance was carried out move and descend to the installation part 1 in the evaluation substrate 2 of the fixture A in an applied part n, and the 2nd page of an evaluation substrate is equipped with them. Then, as an imaginary line shows the solder bump part b1 in drawing 2 , adhesion maintenance is carried out at the maintenance means 7, and while these electronic parts b will be in the state where a rash act is not carried out easily, omission of the electronic parts b when turning over and carrying out this fixture A are prevented.

[0021] And this fixture A is removed from an applied part n, and the electronic parts b currently equipped with and held from the back side of the evaluation substrate 2 in this fixture A as shown in drawing 5 are observed throughout a period of evaluation substrate which has this permeability (visibility) 2. If it is in this observation, it is carried out by the position comparison with the solder bump part b1 and the lattice-like standard display object 6, and the amount of projections of the solder bump part b1 from the standard display object 6 is checked by viewing using a magnifying glass etc.

[0022] For example, since evaluation of the mounting accuracy [ball diameter / of the solder bump part b1] using the ball pitch 0.5mm electronic parts b in 0.3mm is **0.110mm, the judgment permissible level of viewing shall be less than **0.10mm. Moreover, the judgment permissible level of viewing of theta gap is made into less than **0.6 degree. That is, in solder bump part b1 form of the electronic parts b (CSP), if a bump's b1 tip touches said cream solder even if the printed cream solder size is disregarded, since the self alignment effect is large, good junction is expectable.

[0023] Furthermore, if it explains in full detail, as shown in drawing 6 (a) and (b), it will set in

the overlap part of the ball portion of the solder bump part b1, and the lattice-like standard display object 6. it is in wearing of the electronic parts b, and the amount of wearing gaps to a X-Y axial direction judges with going into less than **0.10mm, and good, if having four projection parts b2 which this ball part is beginning to see from two lines of this standard display object 6 can check by viewing -- it is referred to as (O.K.). Since the ball diameter of the solder bump part b1 in the electronic parts b which the thickness of the line of the standard display object 6 uses for evaluation at 0.1mm is 0.3mm at this time, the ideal amount of projections of a ball is set to 0.1mm in each projection part b2. (Refer to drawing 6 (a)) In addition, this amount of projections must conform to all the balls of the solder bump part b1 in the electronic parts b, as shown in drawing 5 .

[0024] However, as shown in drawing 6 (c), the projection part b2 of the ball portion of the solder bump part b1 protruded from two lines of the lattice-like standard display object 6 is that with which four places cannot be found, for example, two cases are judged as a defect (NG) to be. It means that the amount of projections at this time is set to 0.2mm, and had exceeded greatly the judging standard of viewing which shall be less than **0.10mm.

[0025] Moreover, in the quality judging of theta wearing gap, the ball of the solder bump part b1 as shown in drawing 5 [the electronic parts b of an eight piece row] It is what measures the amount of projections of the ball of the end and end by viewing, and checks it. if the angle calculated from this amount of wearing gaps is contained in less than **0.6 degree, it is good -- good [both], since it is 0.55 gap when shown in zero gap and drawing 7 (b) when it is referred to as (O.K.) and shown in drawing 7 (a) -- it is judged with (O.K.).

[0026] However, when it becomes 1.09 gaps and **0.6 degree in a standard allowable angle is exceeded, when shown in drawing 7 (c), and it is further shown in drawing 7 (d), it becomes 2.18 gaps, **0.6 degree will be greatly exceeded in a standard allowable angle, and it is judged as [both] a defect (NG).

[0027] Next, the example which performs Measurement Division of the mounting accuracy of the electronic parts b by Image Processing Division by the detection means 20 is explained. [a point which attachment of the fixture A to an applied part n is performed like the above mentioned example, is in this example, and is different] It is the point performed using the detection means 20 which consists of the image pick-up means 22 and mounts 25, such as a camera sensor by which this example consists of a CCD etc. to the above mentioned work example having recognized the amount of gaps of the ball of the solder bump part b1, and the standard display object 6 by viewing of man.

[0028] As this detection means 20 is shown in drawing 3 and drawing 9 , for example, the surface mounting component mounting machine W is what is prepared in another position or its proper place. [up to / the mount 25 constituted in the shape of / highly precise positioning is made by the numerical operation of motors 23 and 24 / a XY table] to XY axial direction

Fixture A turns over by the grasping means 26, and it is carried out, and is attached, and an image pick-up means 22 to have a Lighting Sub-Division means by which the field turned over and carried out, i.e., the ball side of the solder bump part b1, picturizes the state of having been upwards suitable is opposite-**(ed). Moreover, the Image Processing Division equipment 27 in the control means 8 to which CRT was connected is coordinated with the image pick-up means 22, and the Axis control means 28 in the control means 8 is coordinated with motors 23 and 24.

[0029] Moreover, [this surface mounting component mounting machine W / an image pick-up means 21 to detect the adsorption maintenance state of the electronic parts b before wearing], for example as shown in drawing 3 Run movement of the electronic-parts b bottom by which were attached to the movable object 15 or the mounting head 9, and moved in one with this mounting head 9, and adsorption maintenance was carried out at the adsorption nozzle 10 of this mounting head 9 is carried out, and it is constituted so that the maintenance state of these electronic parts b can be detected.

[0030] First, in the detection means 20, the sign 6a of the evaluation substrate 2 in the fixture A installed in the positioned part on that mount 25 is picturized at least two or more places, it transmits to Image Processing Division equipment 27, and Image Processing Division of this detection result is carried out. By this, the center position and angle of the evaluation substrate 2 in Fixture A or this fixture A are called for.

[0031] Next, Fixture A is installed to an applied part n, and adsorption maintenance of the electronic parts b is carried out by the adsorption nozzle 10 of the mounting head 9, and by the image pick-up means 21, the electronic parts b by which adsorption maintenance was carried out are picturized, it transmits to Image Processing Division equipment 27, Image Processing Division is carried out to the adsorption nozzle 10, and it asks for the center position and angle of the electronic parts b. Then, the installation part 1 of Fixture A is equipped with these electronic parts b so that the center of the electronic parts b concerned may become a fixed position from Sign 6a.

[0032] It is that by which omission of these electronic parts b when turning over and carrying out the rash act and Fixture A of the electronic parts b with which the maintenance means 7 is given to the installation part 1 of this fixture A, and it was equipped are prevented. This fixture A is removed from an applied part n, and it installs so that Fixture A may serve as for back to that positioned mount 25 of a part of the detection means 20.

[0033] Next, it moves so that the center of the camera view which is the image pick-up means 22 in the detection means 20 may agree to the center position of the calculative sign 6a obtained by said operation, and a picture is picturized, and the center of Sign 6a is searched for. At least two or more position detection of this sign 6a is performed, and it asks for the position and angle of the evaluation substrate 2. That is, as shown in drawing 8 , when the

amount of gaps from the center position of the calculative sign 6a is made into "Distance A" and "Distance B", it is the amount of center position gaps =(distance A+ distance B) /2 angle = angle A-angle B. In addition, the center position of the calculative sign 6a is a position of the sign 6a at the time of assuming that Fixture A is installed in the mount 25 of the detection means 20, and there is no position shift error.

[0034] Furthermore, as shown in drawing 10 , the center of the camera view which is the image pick-up means 22 in the detection means 20 moves to the center of the solder bump part b1 in the calculative electronic parts b obtained by said operation, a picture is picturized, and the center of the solder bump part b1 is searched for. Center position detection of all the solder bump parts b1 is performed similarly, it asks for the center position and angle of the electronic parts b, and the average value of the amount of gaps of the center position of all the solder bump parts b1 and the center of the camera view which is the image pick-up means 22 serves as the amount of gaps of the center position of the electronic parts b. [center position / in addition, / of the solder bump part b1 in the calculative electronic parts b] It is the position which offset the distance from the center position of the predetermined solder bump part b1 at the time of assuming that Fixture A is installed in the mount 25 of the detection means 20, and there is no position shift error to each solder bump part b1 calculated beforehand.

[0035] Furthermore, it is in the method of asking for the angle of the electronic parts b by the detection means 20, and in the electronic parts b shown in drawing 11 (a), as shown in this figure (b), beforehand, the group of a lengthwise direction is created for every line along the solder bump part b1, and the group of a transverse direction is created for every line.

[0036] As shown in drawing 11 (b), the center position coordinates of the solder bump part b1 in each group are expressed with a point group, and as shown in drawing 11 (c), they carry out straight line approximation of the row of this point group. The conventional "square error minimizing method" is used for the method of straight line approximation. The average value of the angle of the straight line which approximated the point group into all the groups serves as an angle of the electronic parts b.

[0037] In this way, the value which pulled the center position of the evaluation substrate 2, the center position of an angle to the electronic parts b, and the angle is a thing used as the mounting accuracy of the surface mounting component mounting machine W. good, if it is within the limits of the judging standard of the gap defined beforehand -- it was referred to as (O.K.) and this range was exceeded -- it shifts, it comes out, and if it is, evaluation of a defect (NG) will be judged.

[0038]

[Effect of the Invention] As mentioned above, [the fixture for electronic-parts mounting accuracy evaluation and electronic-parts mounting accuracy valuation method of this invention] Evaluation of the mounting accuracy at the time of a solder bump part equipping the

predetermined position on a printed circuit board with the electronic parts constituted by ball shape can be ensured [simply and], and improvement in the mounting accuracy of the electronic parts to a printed circuit board can be aimed at.

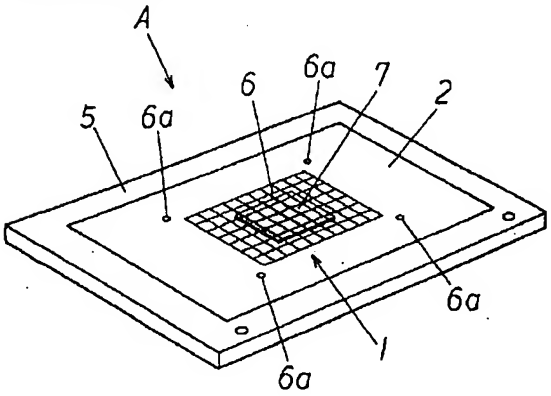
[0039] The evaluation substrate can check the amount of gaps of this standard display object and a solder bump part by viewing by preparing a standard display object in the fixing point in which the installation part of electronic parts was prepared.

[0040] An evaluation substrate is in removal of the fixture from the time of wearing of the electronic parts to a fixture and the applied part in a surface mounting component mounting machine by preparing a maintenance means to prevent secession of these electronic parts with which it was equipped in the fixing point in which the installation part of electronic parts was prepared, and the rash act and omission of electronic parts are prevented. The exceptional effect of ** is done so.

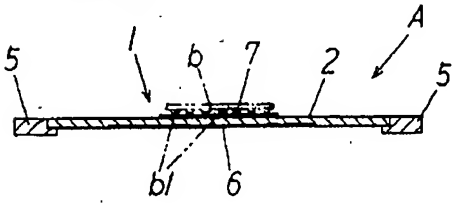
[Translation done.]

DRAWINGS

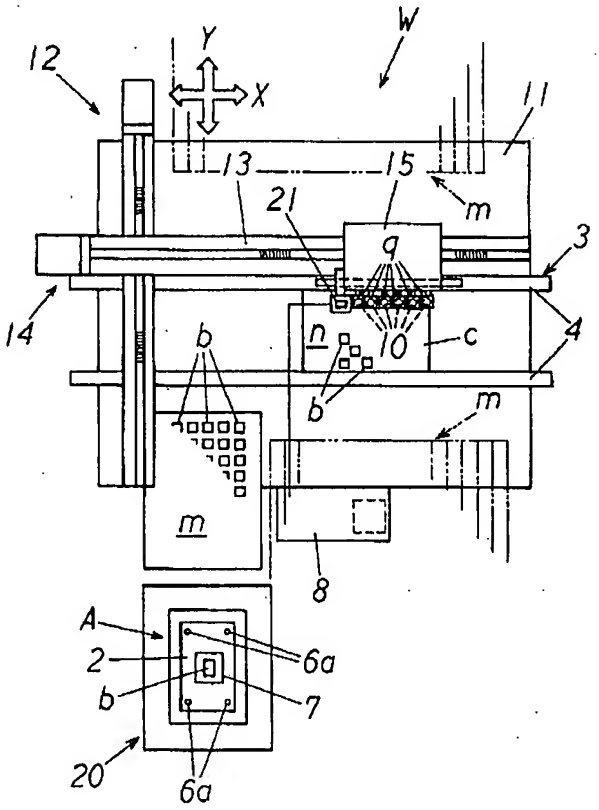
[Drawing 1]



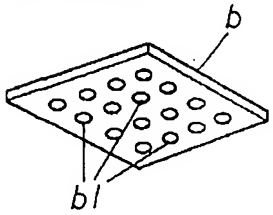
[Drawing 2]



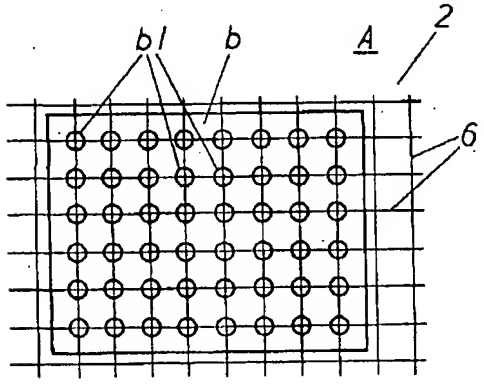
[Drawing 3]



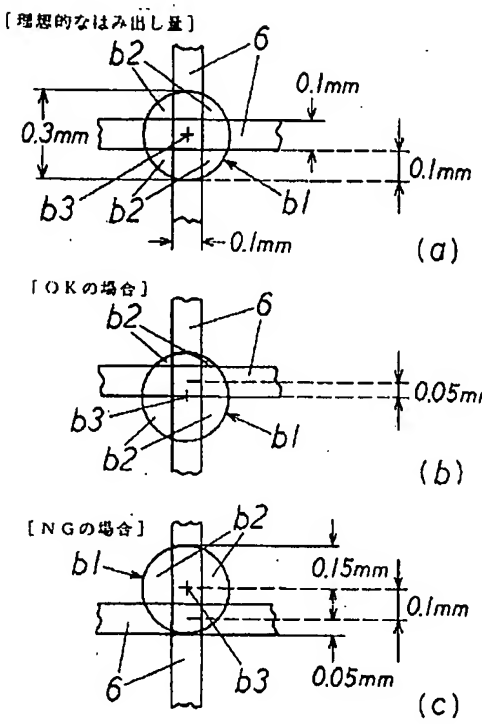
[Drawing 4]



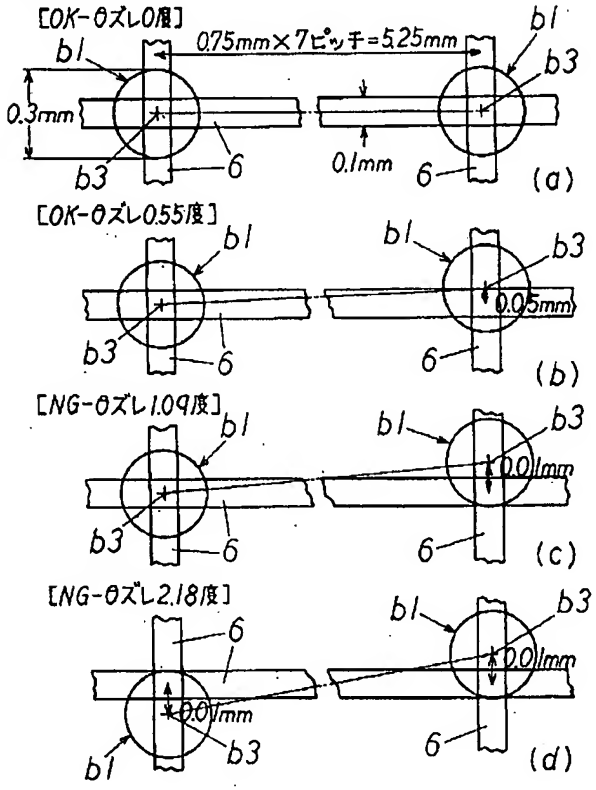
[Drawing 5]



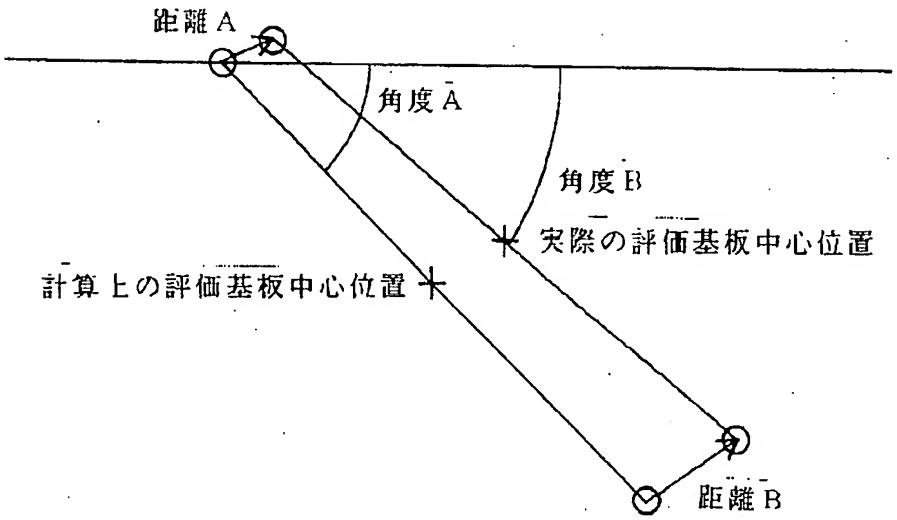
[Drawing 6]



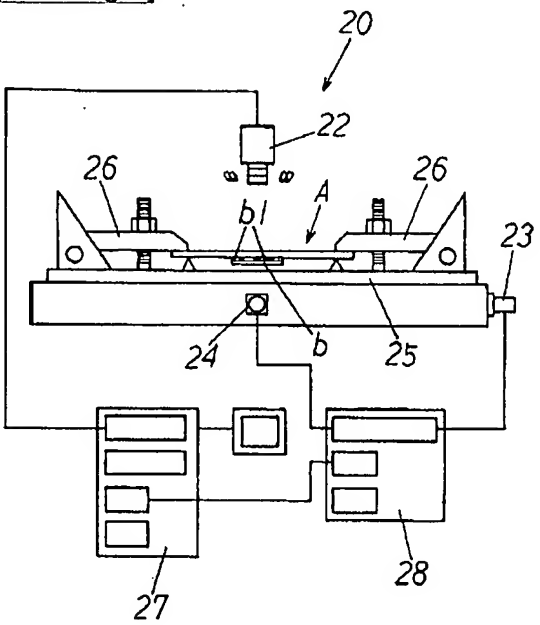
[Drawing 7]



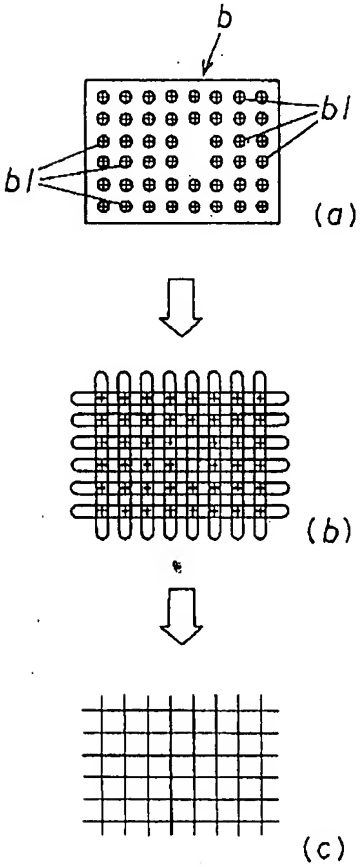
[Drawing 8]



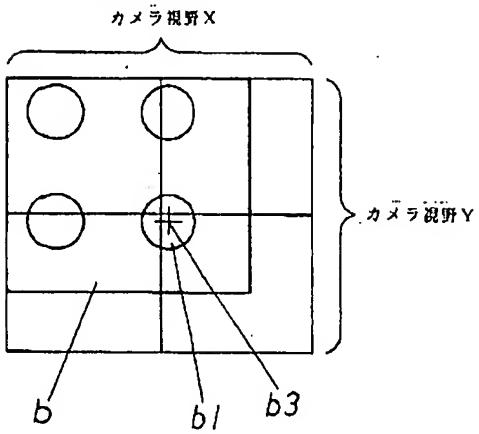
[Drawing 9]



[Drawing 11]



[Drawing 10]



[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view showing one work example of the fixture for electronic-parts mounting accuracy evaluation which adopted the electronic-parts mounting accuracy valuation method about this invention.
[Drawing 2] It is a sectional view in drawing 1 .
[Drawing 3] It is the top view of an outline showing the surface mounting component mounting machine which uses the fixture for electronic-parts mounting accuracy evaluation in drawing 1 .

[Drawing 4] It is the perspective view showing the electronic parts used for the fixture for electronic-parts mounting accuracy evaluation in drawing 1 .
[Drawing 5] It is the explanatory view showing the important section which looked at the fixture of the electronic-parts mounting accuracy valuation method of one work example about this invention from the back.
[Drawing 6] It is the explanatory view showing the method of evaluation XY gap by viewing of the electronic-parts mounting accuracy valuation method in drawing 1 .
[Drawing 7] It is the explanatory view showing the method of evaluation the angle gap by viewing of the electronic-parts mounting accuracy valuation method in drawing 1 .
[Drawing 8] It is the explanatory view showing the method of evaluation the angle gap by the detection means of the electronic-parts mounting accuracy valuation method in drawing 1 .
[Drawing 9] It is the explanatory view showing the detection means of the electronic-parts mounting accuracy valuation method in drawing 1 .
[Drawing 10] It is the explanatory view showing the method of evaluation XY gap by the detection means of the electronic-parts mounting accuracy valuation method in drawing 1 .
[Drawing 11] It is the explanatory view showing the method of evaluation the angle gap by the detection means of the electronic-parts mounting accuracy valuation method in drawing 1 .

[Explanations of letters or numerals]

A The fixture for electronic-parts mounting accuracy evaluation

W Surface mounting component mounting machine

b Electronic parts

b1 Solder bump part

c Printed circuit board

1 Installation Part

2 Evaluation Substrate

6 Standard Display Object

7 Maintenance Means

9 Mounting Head

[Translation done.]

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 04-344411
(43)Date of publication of application : 01.12.1992

(51)Int.Cl. G01B 11/24
G06F 15/62
H05K 13/08

(21)Application number : 03-146787
(22)Date of filing : 22.05.1991

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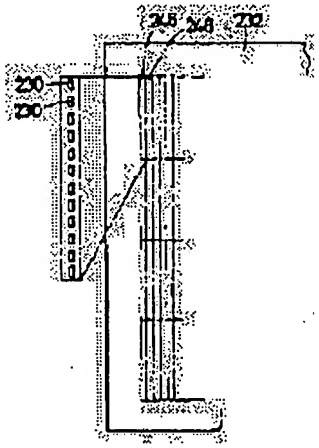
(54) APPARATUS FOR DETECTING ERROR OF ELECTRONIC PART MOUNTING DEVICE

(57)Abstract:
PURPOSE: To provide an apparatus capable of automatically detecting attachment errors of an electronic parts mounting device.
CONSTITUTION: A plurality of dummy chips 230 substantially having mutually identical dimension are attached to a detecting substrate 232 by an electronic parts mounting device so that the dummy chips on the detecting substrate may be photographed by a camera so as to compare the positional data of the image with reference data to calculate the positioned discrepancy of each dummy chip 230 from its regular position and the attachment error of the mounting device is detected. The cause of generating the error is estimated from the obtained attachment error so as to adjustment the mounting device or the error is automatically corrected by storing the data of the attachment error in the mounting device. Thus the maintenance of the mounting device is facilitated or accuracy in the attachment is improved.



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[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-341000
(43)Date of publication of application : 08.12.2000

(51)Int.Cl. H05K 13/04
G06T 7/00
H05K 13/08

(21)Application number : 11-147610
(22)Date of filing : 27.05.1999

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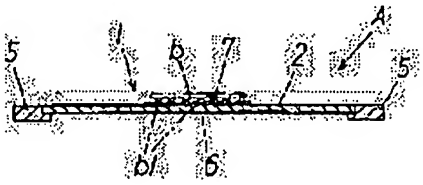
(54) METHOD AND JIG FOR EVALUATING MOUNTING PRECISION OF ELECTRONIC PACKAGED COMPONENTS

(57)Abstract:
PROBLEM TO BE SOLVED: To simply and precisely evaluate mounting precision of an apparatus mounting packaged components on the surface of a printed circuit board, by disposing a transparent evaluation board having portions for mounting electronic packaged components at a specified position in place of a printed circuit board.
SOLUTION: The jig A is used to evaluate mounting precision of an apparatus 1 mounting electronic packaged components (b) on the surface of a printed circuit board, when the components (b) are, for example, a CSP, BGA and the like whose solder bumps b1 are spherical or substantially spherical. The jig A is constituted of a transparent evaluation board 2 having portions 1 for mounting the packaged components (b). The outer periphery of the evaluation board 2 is provided with a frame 5 supported by a transportation rail, and the board 2 is placed, with reference pins and the like, at a correct position predetermined by a mounting control unit.



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[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]